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EXPERIMENTAL STUDY OF SOIL CEMENT BRICKS AND CHARACTERISTICS COMPRESSIVESTRENGTH OF BRICK MASONRY WALL

S. Divya*, K. Nithya, S. Manoj Kumar*** & K. Saravanakumar******
Assistant Professor, Department of Civil Engineering, Sri Shakthi Institute of Engineering and Technology, Coimbatore, Tamilnadu

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Abstract:

This research is intended to provide detailed technical and economic information on the production of compressed cement stabilised soil bricks. These include information on suitable soil types, local stabilisers, stabilization techniques, production of compressed stabilized soil bricks and their economical value and potential. Critical review of related literatures show that soil types, proportions between soil and stabilizer and compaction pressure applied to the moist soil mix affects the quality of the compressed soil brick. Since the soil used to manufacture the stabilized soil bricks are abundantly available all around the Tamil Nadu. Laboratory tests conducted on Perundurai area soil provided more precise and detailed information on the soils grading, plasticity, chemical composition and the result proved the soil's suitability for brick production. Using the Ordinary Portland Cement manufactured as stabilizer and soil sample from Perundurai, three different series of tests were prepared based on literature recommendations. Tests were conducted on soil bricks performance like compressive strength and water absorption on which the durability of the blocks depend. The effects of compaction pressure on the quality of the soil bricks, the optimum cement content for stabilization and cost comparison with hollow concrete bricks are prepared. The performance characteristics of local stabilizers are evaluated and comparisons are made. The investigation has revealed that from the bricks produced at the varying cement contents from 12% in increments of 2% up to 16% at constant compressive pressure of 10MPa, all the blocks except bricks produced by 16% cement have 21stday wet compressive strength values well above most of the recommended minimum values for use in structural work. Thus 16% cement is taken as optimum cement content for stabilization of Tamil Nadu soil for brick production. Further increasing cement content results in an increase in the compressive strength value and a decrease in the absorption capacity of the soil brick. Increment of the compaction pressure also improves the compressive strength of soil cement brick. Comparisons of the effects of local brick masonry and soil brickmasonry showed that soil brick masonry has shown better stabilization effect based on the 21stday compressive strength of bricks. The cost comparison with the conventional wall making material, hollow concrete bricks, has revealed that compressed cement stabilized soil brick is preferred because it is more economical walling material lin itself and permits the use of economical building techniques.

1. Introduction:

General: Soil Cement Bricks (SCB) is cost effective content of soil cement bricks. The compressive strength of brick is also greatly depends on the soil cement blocks. According to the masonry standard the compressive and energy efficient alternative materials to the normal burnt clay bricks used for construction of buildings. Soil cement blocks are also known as stabilized mud bricks (SMB) or stabilized compressed earth bricks (SCEB). Soil cement bricks are used for load bearing masonry. The paper focuses the study of various characteristics of soil-cement bricks using suitable clay soils through an experimental investigation. Characteristics of soil cement bricks having two different cement contents (12% and 16%) have been examined. Paper reports results of influence of cement content on compressive strength, the initial rate of absorption (IRA), water absorption, rate of water absorption, wet compressive strength, compressive strength of half brick and efflorescence test of soil-cement blocks .The rate of water absorption greatly depends on the cement strength is basically dependent on factor such as mortar strength, mortar type; slenderness ratio and eccentricity loading. To determine the characteristics compressive strength of brick masonry wall with variations of different mortar mix ratio (1:3 & 1:5).

2. General Properties of Soil Cement Mixture:

Properties and Analysis of Soil for Soil Cement Bricks:

General Properties: Soil is the result of the transformation of the underlying rock under the influence of physical, chemical and biological processes related to biological and climatic conditions. It is found deposited on the surface of the earth and may consists of many different types. The variation in the soils present at the surface can be attributed to a series of natural effects working on the area over time. On the very surface of the soil one typically finds material with a large amount of organic compounds. Using a suitable soil for soil-cement block production will result in:

- ✓ Strong blocks, namely those that after curing possess high wet strength and erosion resistance.
- ✓ Handle able bricks that immediately upon de moulding can be transferred toa

Curing area without a high breakage rate.

- ✓ Block that will not seriously distort or crack during curing.
- ✓ Bricks, which will not expand and contract excessively in the building if subjected to wetting and drying cycles.

Specifically disqualified soils are:

- ✓ Those containing high excessive organic impurity.
- ✓ Those, which are highly expansive.
- ✓ Those containing excessive soluble salts e.g. gypsum and chalk.

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Soil as a Building Material: There are many methods to reduce a soil's susceptibility to weakening by water. These fall in to the following broad categories:

- ✓ Protecting the wall from exposure to water,
- ✓ Reducing the permeability of the wall by increasing the soil density,
- ✓ Making the soil water-repellant by the addition of a water proofing agent and
- ✓ Providing a secondary cementitious- type strength mechanism which is largely unaffected by water.

3. Properties of Materials and Test on Material:

The soil used in this investigation was brought from perundurai area at location of Nandha engineering college, which is about 10km of erode. It was found out with different sizes and deleterious substances. It was then pulverized, and sieved to the appropriate size. The physical properties and chemical compositions of the soil are determined. Sandy soils containing predominantly non- expansive clay minerals (like kaolinite) are ideally suited for the production of soil-cement bricks. It is desirable that such soils have sand content >65% and a clay fraction of about 10%. Soils with higher clay fractions can be reconstituted by adding inert materials like sand/stone quarry dust/mine wastes etc. to bring down the clay fraction of the mix.

Cements: Cement is building materials which act as a binding agent of material. It is used as a binding material in which binding together various building material such as soil, brick, and stone etc.,

Water: Water is an important ingredient of bricks as it actively participates in the chemical reaction with cement. Since it help to form the strength giving cement gel

Table 3.1: Name of the Soil Cement Bricks

S.No	Name of bricks	Dimensional area (mm^2)	Height of brick (mm)
1.	SCB	(190×90)	101 mm
2.	HB	(190×90)	101 mm
3.	CDB	20681	101 mm
4.	CB	36129	101 mm
5.	SCOB	84800	101 mm
6.	CCOB	64856	101 mm

Description of SCB:

SCB: The SCB brick having the size of (210×100×100) mm. It is used as a load bearing and non load bearing wall. The colour of the brick is light brown.

HB: The HB brick having the size of (210×100×150) mm. It is used as a load bearing and non load bearing wall. The colour of the brick is light brown.

CDB: This brick is used only in the outer corner side of the brick masonry wall. The CDB having the size of (210×100×100) mm normal size brick but to cut the stretcher face of about 50mm and cut the header face of about 50mm from the edge.

CB: The size of brick should be designed first and second brick size. The first brick having the size of normal brick size (210×100×100) mm. The second brick size having the size of (126×100×100) mm. The first brick size is attached to the second brick size perpendicular at the one end of the stretcher face.

SCOB: This brick having the size of 300mm length and 300 width and height of about100mm.This brick is only used for the column bearing. It is used only for one story building.

CCOB: This brick having the size of 300mm outer dia and 100 mm inner dia height of about100mm.This brick is only used for the column bearing. It is used only for one story building. The CCOB having the hallow structure at centre of about 100mm dia which is used to place the reinforcement and concrete inside the centre hole of this brick and act as load bearing of column.

Test Onsoil:

Specific Gravity of Soil: Specific gravity of soil sample = 2.675

Brick: Brick is used as a building material for load bearing structures. The brick consists of header and stretcher faces. The brick consists of frog at the top surface which is used to bind the mortar and bricks in brick masonry structure.

Specifications of Soil Cement Brick: Before the preparation of bricks, the specification of the brick is important. The five types of bricks are prepared to determine the strength and properties of bricks. In this specification, the names, short forms and areal dimension of soil cement bricks.

Test on Cement:

Initial and Final Setting Time Test:

The initial setting time of cement = 30 minutes. The final setting time of cement = 590 minutes.

Tests on Fine Aggregate (Sand):

Specific Gravity of Fine Aggregate

Specific gravity of fine aggregate =2.45

4. Mix Proportion and Test on Bricks:

Mix Proportion: The materials for manufacturing the interlocking brick consists of cement, laterite soil and sand with ratio of 1:1:6(cement: sand: soil) by volume. The use of volume rather than weight is due to simplicity of the manufacturing .The corresponding mixing mass ratio of the reference sample is27.6:4.0:4.2 kg. Soil, sand and cement were mixed together in the drum mixer. Water was gradually added into the mixer

Preparation of Bricks Using Different Mix Ratio: Providing detailed technical and economic information on the production of compressed stabilized earth bricks by assessing the potential of local materials i.e. types of cement and soil is the purpose of this

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investigation. The type of Portland cement and a soil sample are selected and prepared. To this effect the following test programs, are followed. The mix proportions are made based on literature recommendations. The mix proportions of bricks are prepared to compare the difference in compressive strength values with age, rate of strength development of the block produced using different mix ratio (SCBR-1 & SCBR-2). They are made with 24% of water and cement content of 12% and 16% by weight of soil. The Mix proportions are given:

S.No	Name of the brick	Dry compressive strength of bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	7.6	7.54	7.57	Mpa
2	Hollow block	5.8	5.74	5.79	Mpa
3	Corner design brick	5.8	5.64	5.72	Mpa
4	Corner brick	4.58	4.99	4.7	Mpa
5	Square column brick	9.6	9	9.3	Mpa
6	Circular column bricks	5.5	5.4	5.45	Mpa

1. SCBR-1 (1:1:6)
2. SCBR-2 (1:1:8)

Table 4.1: Table for size of brick

S.No	Name of bricks	Dimensional area (mm^2)	Height of brick (mm)
1.	SCB	(190×90)	101 mm
2.	HB	(190×90)	101 mm
3.	CDB	20681	101 mm
4.	CB	36129	101 mm
5.	SCOB	84800	101 mm
6.	CCOB	64856	101 mm

The prepared bricks were stacked up to 5 layers and kept it in a shaded area. The top layers were covered with jute cement bags for curing .The bricks were cured for 28 days and were tested. Out of the 7 bricks prepared for each soil mix, 3 bricks were used for dry compressive strength, 2 for wet compressive strength, 1 each for erosion and water absorption (durability) tests.

Tests on Soil Cement Bricks: The test on bricks can be conducted to determine the strength and properties of bricks. The seven tests are shown in below:

- ✓ Dry compressive strength test
- ✓ Wet compressive strength test
- ✓ Initial rate of water absorption test
- ✓ Water absorption test
- ✓ Efflorescence test
- ✓ Dry compressive strength test of half bricks
- ✓ Wet compressive strength test of half bricks

Dry Compressive Strength Test:

Table 4.2: Dry compressive strength with varying Cement content (16%) of soil – cement bricks (1:1:6)

S.No	Name of the brick	Dry Compressive strength of bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	7.6	7.54	7.57	Mpa
2	Hollow block	5.8	5.74	5.79	Mpa
3	Corner design brick	5.8	5.64	5.72	Mpa
4	Corner brick	4.58	4.99	4.7	Mpa
5	Square column brick	9.6	9	9.3	Mpa
6	Circular column bricks	5.5	5.4	5.45	Mpa

Table 4.3: Dry compressive strength with varying Cement content (12%) of soil – cement bricks (1:1:8)

S.No	Name of the brick	Dry compressive strength of bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	6.43	6.37	6.46	Mpa
2	Hollow block	5.26	5.12	5.19	Mpa
3	Corner design brick	4.78	4.84	4.81	Mpa
4	Corner brick	3.3	3.7	3.5	Mpa
5	Square column brick	6.53	6.62	6.5	Mpa
6	Circular column bricks	4.56	4.63	4.59	Mpa

From the above table 5.3 and 5.4, to draw the graph between compressive strength value and cement content of bricks and get a result from the corresponding graph

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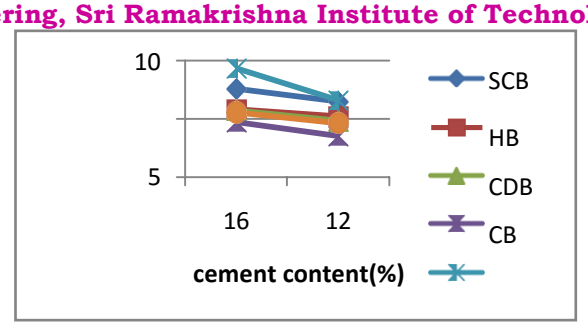

Figure 4.1: Dry compressive strength with varying Cement content (16%&12%) of soil – cement bricks (1:1:6&1:1:8)

Wet Compressive Strength Test:

Table 4.4: wet compressive strength with varying Cement content (16%) of soil – cement bricks (1:1:6).

S.No	Name of the brick	Wet Compressive Strength of bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	5.2	5.32	5.2	Mpa
2	Hollow block	4.3	4.42	4.36	Mpa
3	Corner design brick	4.3	4.89	4.8	Mpa
4	Corner brick	3.67	3.8	3.73	Mpa

Table 4.5: wet compressive strength with varying Cement content (12%) of soil – cement bricks (1:1:8)

S.No	Name of the brick	Wet Compressive Strength of bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	4.36	4.18	4.27	Mpa
2	Hollow block	3.64	3.39	3.5	Mpa
3	Corner design brick	3.5	3.9	3.7	Mpa
4	Corner brick	3.2	3.39	3.29	Mpa
5	Square column brick	5.4	5.9	5.65	Mpa
6	Circular column bricks	3.56	3.61	3.58	Mpa

From the above table 4.4 and 4.5, to draw the graph between compressive strength value and cement content of bricks and get a result from the corresponding graph :

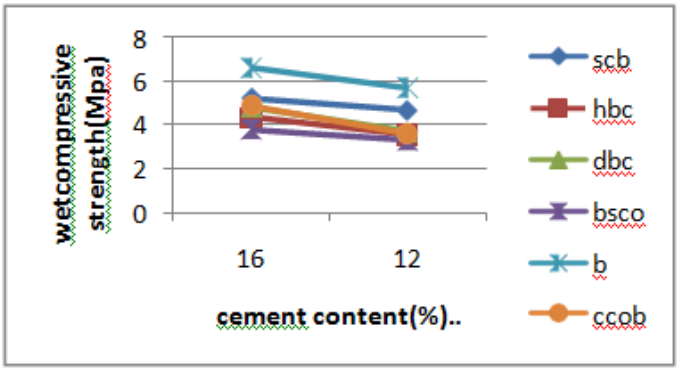

Figure 4.2: wet compressive strength with varying Cement content (16% & 12%) of soil – cement bricks (1:1:6&1:1:8)

Water Absorption Test:

Table 4.6: Water absorption test with varying cement content (16%)

S.No	Name of the brick	Water absorption test of bricks (%)		
		1	2	Average
1	Soil cement bricks	11.38	11.48	11.43
2	Hollow block	11.72	11.53	11.62
3	Corner design brick	11.41	11.6	11.5
4	Corner brick	10.62	10.91	10.76
5	Square column brick	10.28	10.4	10.34
6	Circular column bricks	10.67	10.58	10.62

Table 4.7: Water absorption test with varying cement content (12%)

S.No	Name of the Brick	Water Absorption Test of Bricks (%)		
		1	2	Average
1	Soil Cement Bricks	12.48	12.65	12.58
2	Hollow Block	12.61	12.88	12.74
3	Corner Design Brick	12.12	12.34	12.23

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4	Corner Brick	11.92	11.91	11.9
5	Square Column Brick	12.9	13.1	13.0
6	Circular Column Bricks	13.0	12.89	13.0

From the above table 4.6 and 4.7, to draw the graph between water absorption value and cement content of bricks and get a result from the corresponding graph

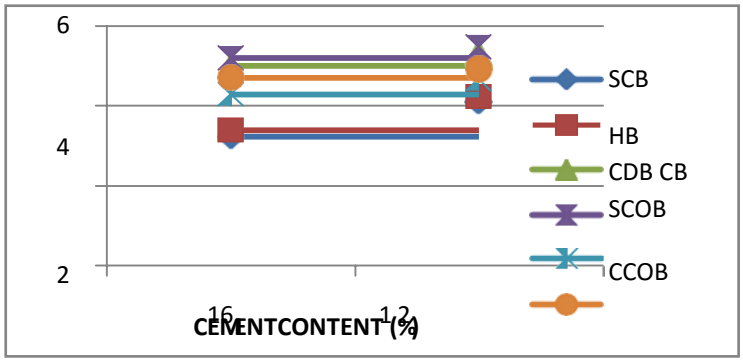

Figure 4.3: Water absorption test with varying cement content (16% & 12%)

Dry Compressive Strength of Half Bricks:

Table 4.8: Dry compressive strength test of half bricks with varying cement content (16%)

S.No	Name of the Brick	Dry compressive strength of half bricks			Units N/mm^2
		1	2	Average	
1	Soil Cement Bricks	7	7.13	7.06	Mpa
2	Hollow Block	4.6	4.81	4.70	Mpa
3	Corner Design Brick	4.8	4.72	4.76	Mpa

Table 4.9: Dry compressive strength test of half bricks with varying cement content (12%)

S.No	Name of the brick	Dry compressive strength of half bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	4.67	4.99	4.83	Mpa
2	Hollow block	3.0	3.1	3.05	Mpa
3	Corner design brick	3.8	3.74	3.79	Mpa

From the above table 4.8 and 4.9 , to draw the graph between dry compressive strength value and cement content of half bricks and get a result from the corresponding graph

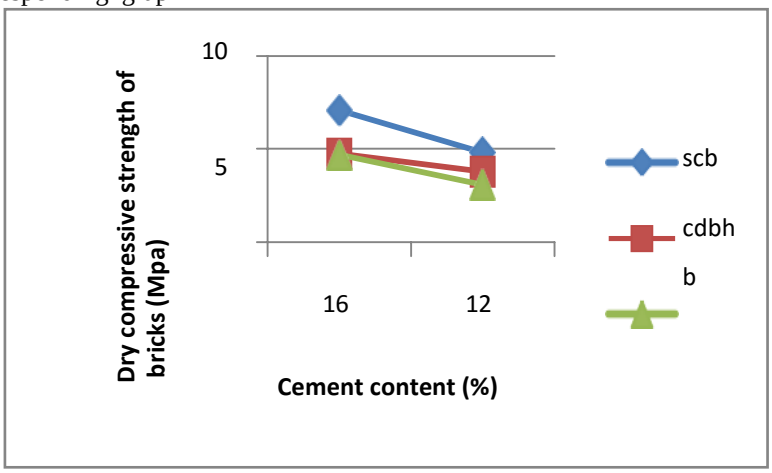

Figure 4.4: Dry compressive strength test of half bricks with varying cement content (16% & 12%).

Wet Compressive Strength of Half Bricks:

Table 4.10: Wet compressive strength test of half bricks with varying cement content (16%)

S.No	Name of the brick	Wet Compressive Strength of half bricks			Units N/mm^2
		1	2	Average	
1	Soil cement bricks	4.6	4.54	4.57	Mpa
2	Hollow block	3.05	3.23	3.14	Mpa
3	Corner design brick	3	3.14	3.07	Mpa

Table 4.11: Wet compressive strength test of half bricks with varying cement content (12%)

S.No	Name of the brick	Wet Compressive Strength of half bricks			Units N/mm^2
		1	2	Average	

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1	Soil cement bricks	3.5	3.87	3.68	Mpa
2	Hollow block	2.33	2.48	2.40	Mpa
3	Corner design brick	2.4	2.52	2.405	Mpa

From the above table 4.10 and 4.11 , to draw the graph between wet compressive strength value and cement content of half bricks and get a result from the corresponding graph:

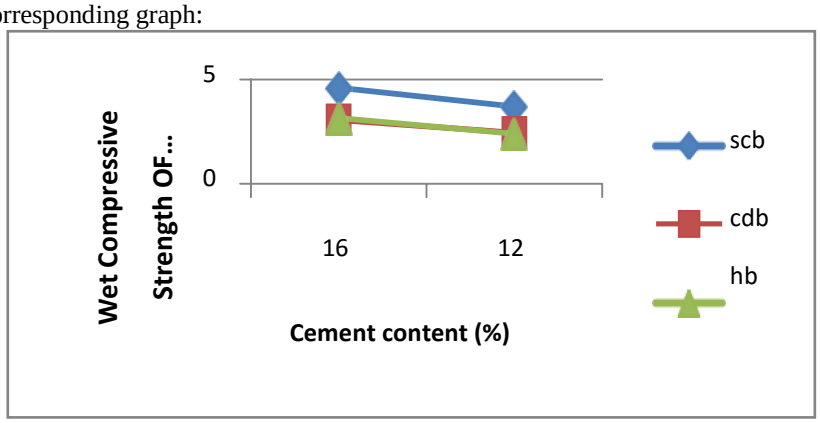

Figure 4.5: Wet compressive strength test of half bricks with varying cement content (16% & 12%).

Initial rate of Water Absorption:

Table 4.12: For initial rate of Water absorption of bricks

S.No	Name of the brick	Initial rate of Water absorption of bricks (%)		
		M1	M2	Result (%)
1	Soil Cement Bricks	3.56	3.76	5.2
2	Hollow Block	6.09	6.296	3.34
3	Corner Design Brick	3.854	4.044	5.0
4	Corner Brick	6.046	6.241	3.22
5	Square Column Brick	15.0	15.64	4.29
6	Circular Column Bricks	11.85	12.41	4.7

Efflorescence Test: Soil cement bricks may contain soluble salts that come to the surface when the brick dries. The source of these soluble salts is the raw materials used in the brick production process. Brick efflorescence should not be confused with the efflorescence that is seen on masonry walls after construction. This form of efflorescence is caused mainly from the raw materials and water used in the wall construction process (eg. Mortar).Brick efflorescence is usually white but there is a special form of efflorescence (known as vanadium staining) that is coloured yellow, green or reddish-brown and is therefore particularly visible on light coloured bricks. All efflorescence is more or less visible depending on the colour and surface texture of the brick. Soil cement bricks have a nil to slight efflorescence.

Figure 4.7: Efflorescence of brick

From the above figure a brick surface shows a slight salt surface. the efflorescence of the soil cement bricks is nil to slight.

SCB Masonry Wall:

Brick Masonry: Masonry is the building of structures from individual units laid in and bound together by mortar: the term masonry can also refer to the units themselves. The common materials of masonry construction are bricks .Masonry is generally a highly durable form of construction. However, the materials used, the quality of the mortar and workmanship, and the pattern in which the units are assembled can significantly affect the durability of the overall masonry construction.

Concept of Brick Masonry: The brick masonry can be constructed by using SCB brick specimen. The brick masonry wall specimen is constructed by varying the mortar mix ratio (1:3 &1:5).From the brick specimen, to determine the compressive strength of brick masonry for 1(one) cubic feet. The brick masonry is designed and to determine the strength for 1 cubic feet. The design of brick masonry for 1cubic feet calculation is shown below:

L×B×H = 1 cubic feet

L×B×H = 12×12×12 cubic inch L×H×9" = 1728 $inch^3$

L×H = (1728) ÷ (9)

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L=H = 192 inches & B=9 inches.

Above calculation, to design and determine the length and width of brick masonry wall specimen

6. Preparation of Brick Masonry Wall:

Properties of Cement Mortar: When water is added to intimate dry mixtures of cement and sand, hydration of cement starts and it binds sand particles and the surrounding surfaces of masonry and concrete. The strength of mortar depends upon the proportion of cement and sand. Strengths obtained with various proportions of cement and sand is shown intable:

Table 6.1: Compressive strengths for various mix proportions

S.No	Mix proportion (Cement: Sand)	Compressive strength
1.	1:3	10N/mm^2
2.	1:4	7.5N/mm^2
3.	1:5	5.0N/mm^2

Type of Mortar:

- ✓ M1 mortar mix ratio (1:3)
- ✓ M2 mortar mix ratio (1:3)

7. Test and Comparison Between the SCB and Normal Burnt Clay Brick Masonry Wall:

Test on Mortar:

Compressive Strength of M1 Mortar (1:3): Compressive strength of M1 mortar at 28 days (1:3) = 10 N/mm2

Compressive Strength of M2 Mortar (1:5): Compressive strength of M2 mortar at 28 days (1:5) = 5 N/mm2

Preparation of Brick Masonry Wall Specimen Using Soil Cement Bricks with Varying Mortar Mixratio:

- ✓ Specimen 1(1:3mortar used)**:** The SCB is used to construct the brick masonry wall (BMW).The brick masonry wall is constructed using 1:3 mortar mix ratio. The masonry is prepared by using the English bond method. The thickness of mortar mix is placed in the 10mm.The preparation of mortar is using the proportion of the 1 part of cement and 3 part of sand. The layer of the mortar is placed uniformly over brick face. The design of brick masonry is prepared, the length of brick masonry is 14" inches and width is 9" inches only.
- ✓ Specimen 2 (1:5mortar used): The SCB is used to construct the brick masonry wall (BMW).The brick masonry wall is constructed using 1:5 mortar mix ratio. The masonry is prepared by using the English bond method. The thickness of mortar mix is placed in the 10mm.The preparation of mortar is using the proportion of the 1 part of cement and 5 part of sand. The layer of the mortar is placed uniformly over brick face. The design of brick masonry is prepared, the length of brick masonry is 14" inches and width is 9" inches only

Test on Brick:

Test on Soil Cement Brick Masonry Wall:

Compressive Strength Test of Brick Masonry Wall Specimen 1: Place the specimen 1 of soil cement brick masonry wall with flat faces horizontal and mortar filled face facing upwards between plates of the testing machine. Apply load axially at a uniform rate per minute till failure occurs and note maximum load at failure. The load at failure is maximum load at which the specimen fails to produce any further increase in the indicator reading on the testing machine. Finally, to determine the compressive strength test of brick specimen 1.

Compressive Strength Test of Brick Masonry Wall Specimen 2: Repeat this testing procedure, Place the specimen 2 of soil cement brick masonry wall with flat faces horizontal and mortar filled face facing upwards between plates of the testing machine. Apply load axially at a uniform rate per minute till failure occurs and note maximum load at failure. The load at failure is maximum load at which the specimen fails to produce any further increase in the indicator reading on the testing machine. Finally, to determine the compressive strength test of brick specimen 2. The compressive strength of specimen 2 is less than the compressive strength of specimen 1, because of varying the cement mortar. From the below table, shows the compressive strength result of brick masonry specimen1 & specimen2:

Table 7.1: Characteristic Compressive Strength of soil cement brick masonry wall with different mortar mix ratio for 1cubic feet

S.No	Name of specimen	compressive strength of soil cement brick masonry wall	
		1:3 ratio	1:5 ratio
1	SCB specimen 1	6.19	3.6
2	SCB specimen 2	6.27	3.51
Result (Mpa)		6.23	3.55

Test on Burnt Clay Brick Masonry Wall:

Compressive Strength Test of Brick Masonry Wall Specimen 1: Place the specimen 1 of burnt clay brick masonry wall with flat faces horizontal and mortar filled face facing upwards between plates of the testing machine. Apply load axially at a uniform rate per minute till failure occurs and note maximum load at failure. The load at failure is maximum load at which the specimen fails to produce any further increase in the indicator reading on the testing machine. Finally, to determine the compressive strength test of brick specimen 1.

Compressive Strength Test of Brick Masonry Wall Specimen 2: Repeat this testing procedure, Place the specimen 2 of burnt clay brick masonry wall with flat faces horizontal and mortar filled face facing upwards between plates of the testing machine. Apply load axially at a uniform rate per minute till failure occurs and note maximum load at failure. The load at failure is maximum load at which the specimen fails to produce any further increase in the indicator reading on the testing machine.

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Finally, to determine the compressive strength test of brick specimen 2. The compressive strength of specimen 2 is less than the compressive strength of specimen 1, because of varying the cement mortar. From the below table, shows the compressive strength result of brick masonry specimen1 & specimen 2:

Table 7.2: characteristic compressive strength of ordinary burnt clay brick masonry wall with different mortar mix ratio for 1cubic feet

S.No	Name of specimen	Compressive Strength of soil cement brick masonrywall	
		1:3 ratio	1:5 ratio
1	SCB specimen 1	5.23	3
2	SCB specimen 2	5.31	3.2
Result (Mpa)		**5.27**	**3.1**

From the above table 7.2 , to draw the graph between compressive strength value and cement mortar content of burnt clay brick masonry and get a result from the corresponding graph

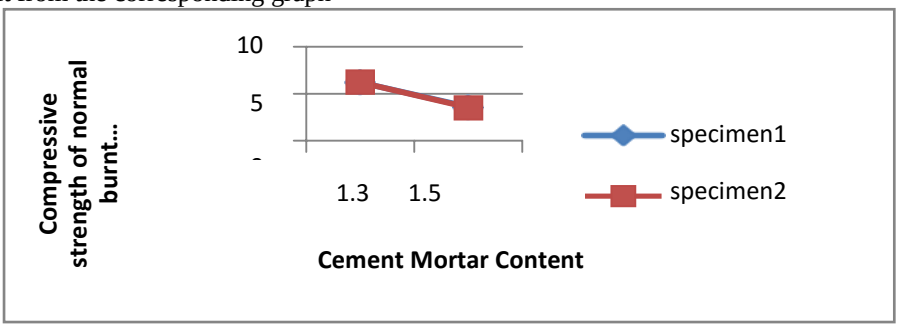

Figure 7.2: Characteristic compressive strength of ordinary burnt clay brick masonry wall with different mortar mix ratio

Preparation and Test of CCOB Brick Masonry Reinforced Column Using Mortar (1:3):

The compressive strength of CCOB masonry reinforced column for 1cubic feet=4.01 N/mm^2 or Mpa

Comparison Between the Soil Cement Brick and Burnt Clay Bricks:

Table 7.3: For Comparison between the soils cement brick and burnt clay bricks

S.No	Properties of bricks	Soil cement brick	Burnt claybrick
1.	Size of brick	228×101×101	220×100 ×100
2.	Compressive strength	7.2 N/mm2	6 N/mm2
3.	Water absorption of brick	8-10%	8-12%
4.	Efflorescence	nil	Nil
5.	Weight of brick	3.3 to 3.50 Kgs	3.4 to 3.60 Kgs
6.	Composition	Soil (raw earth with clay),cement (OPC) &sand (stabiliser)	Red soil &clay.
7.	Colour of brick	Light white colour	Copper colour
8.	Compressive strength of brick masonry wall for 1cubic feet	5.27N/mm2(1:3mortar used) 3.10N/mm2(1:5mortar used)	6.23N/m m2(1:3) 3.55N/m m2(1:5 mortar)

7. Conclusion:

From literature the best soil composition for soil-cement is 75% sand, 25% silt and clay, of which more than 10% is clay. In this research, Soil with a composition of Sand 70%, Silt 16.25% and Clay -13.75% is used as a raw material for soil cement. Increase in cement content results in an increase in the compressive strength value of bricks made at the same constant compaction pressure. The moisture absorption capacity of the brick could be significantly correlated to its durability. Increase in the cement content of brick results into a reduction of its water absorption capacity. Increase in the cement content of brick results into a reduction of its initial rate of water absorption. The amount of water for the soil-cement mixture needs to be carefully controlled. There needs to be sufficient moisture for the cement to fully hydrate but no excess of water which would reduce the final density, increase porosity and reduce final strength.The two type of mortar mix ratio (1:3 and 1.5) is used in the soil cement brick masonry wall and to determine the compressive strength of brick masonry wall. In the mortar mix ratio (M1- 1:3), increase in cement percentage and gives the maximum compressive strength value of brick masonry wall. In the mortar mix ratio (M2- 1:5), decrease in cement percentage and gives the minimum compressive strength value of brick masonry wall when compared to the mortar mix ratio (M1).In the (SCBR-1) soil cement brick ratio (1:1:6), increase in cement percentage (16%) and gives the maximum compressive strength value of brick. In the (SCBR-2) soil cement brick ratio (1:1:8), decrease in cement percentage (12%) and gives the minimum compressive strength value of brick when compared to the (SCBR-1) soil cement brick ratio (1:1:6)

8. References:

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